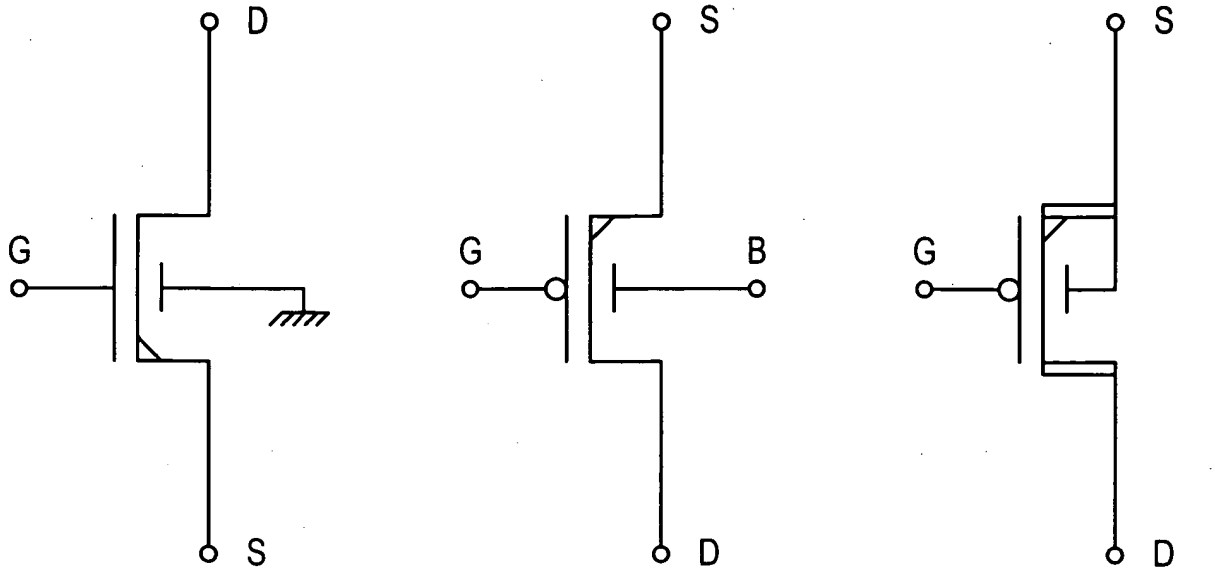
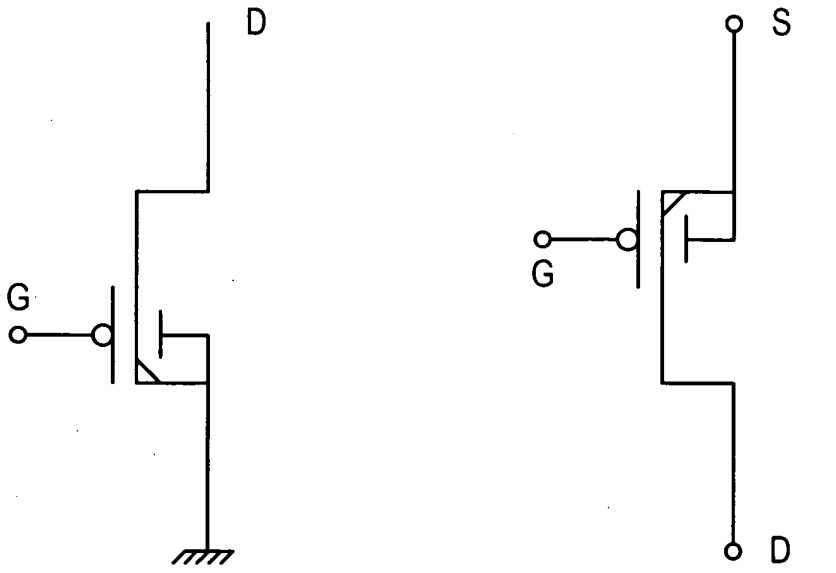


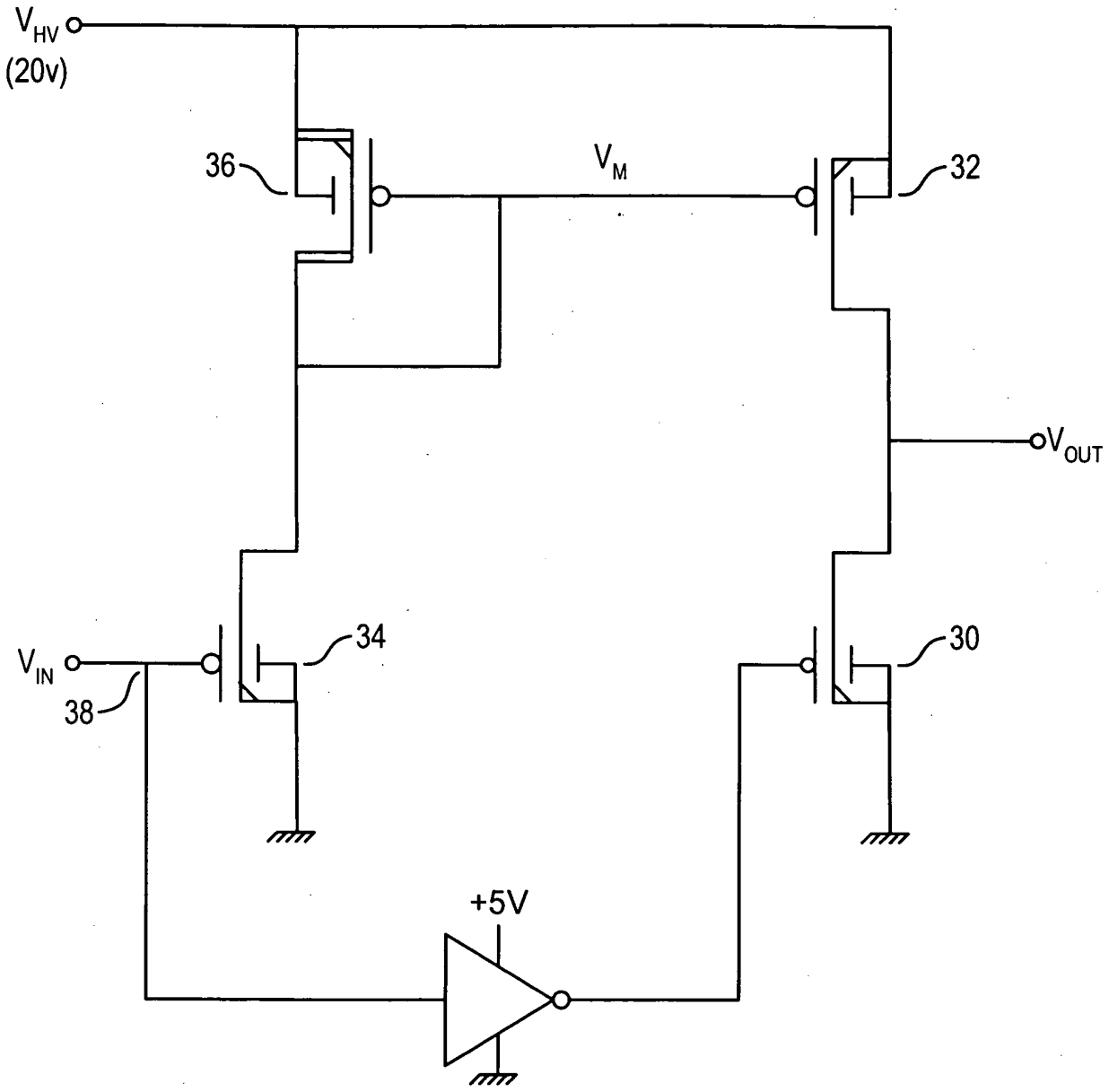
(a) 5V NMOS (b) 5V PMOS (c) HV PMOS



(d) HV NDMOS (e) HV PDMOS

PRIOR ART

FIG. 1



PRIOR ART

FIG. 2

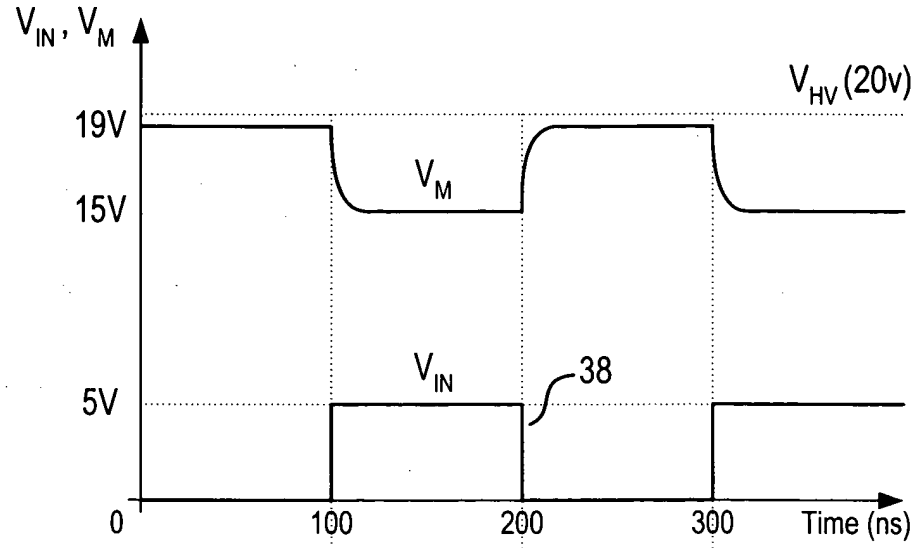


FIG. 3A

FIG. 3B

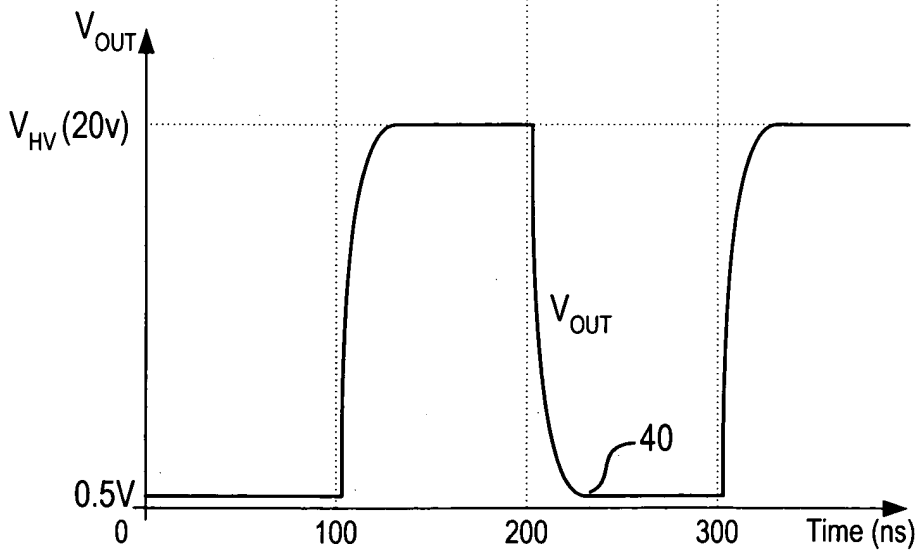
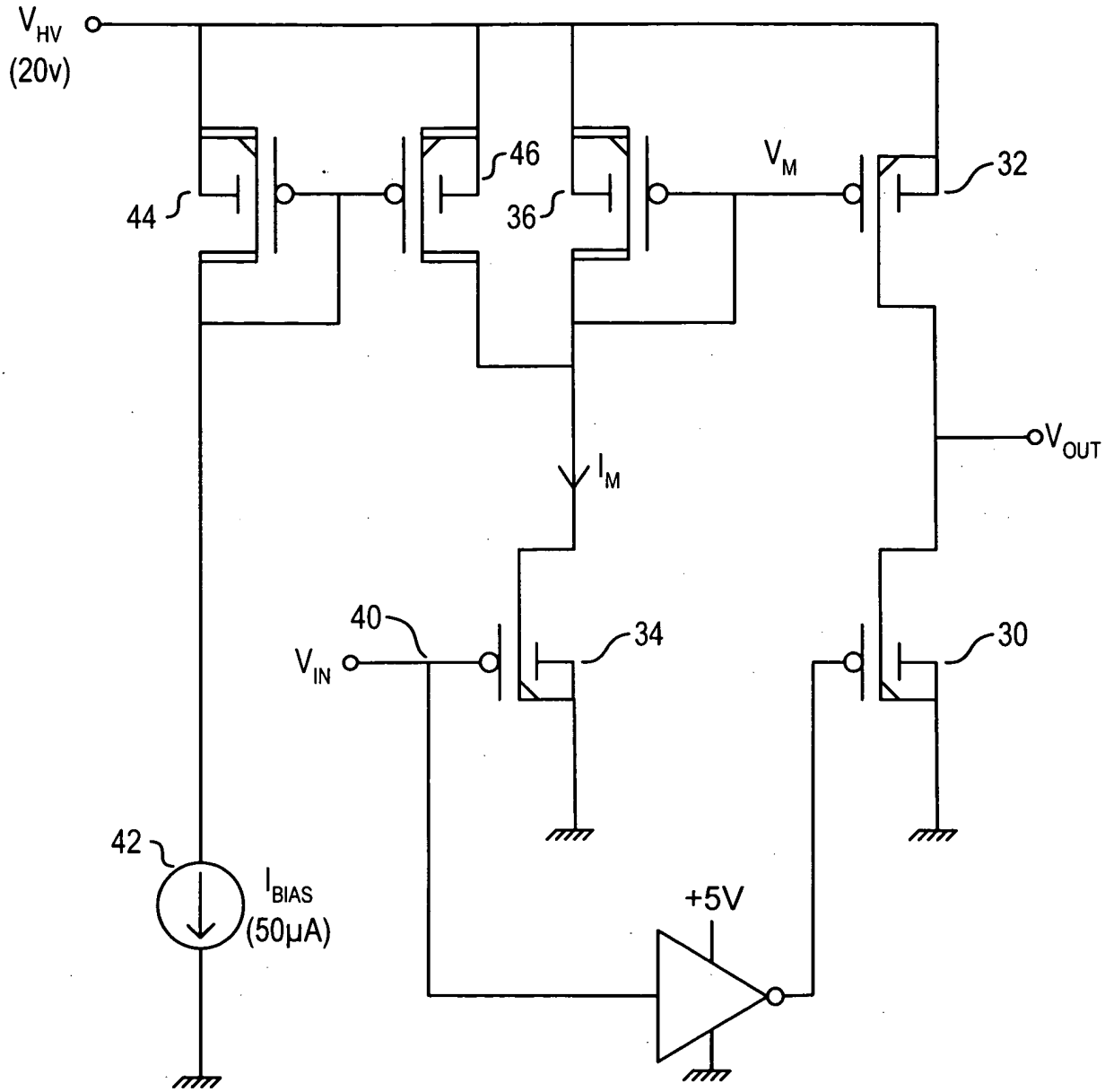


FIG. 3C

PRIOR ART



PRIOR ART

FIG. 4

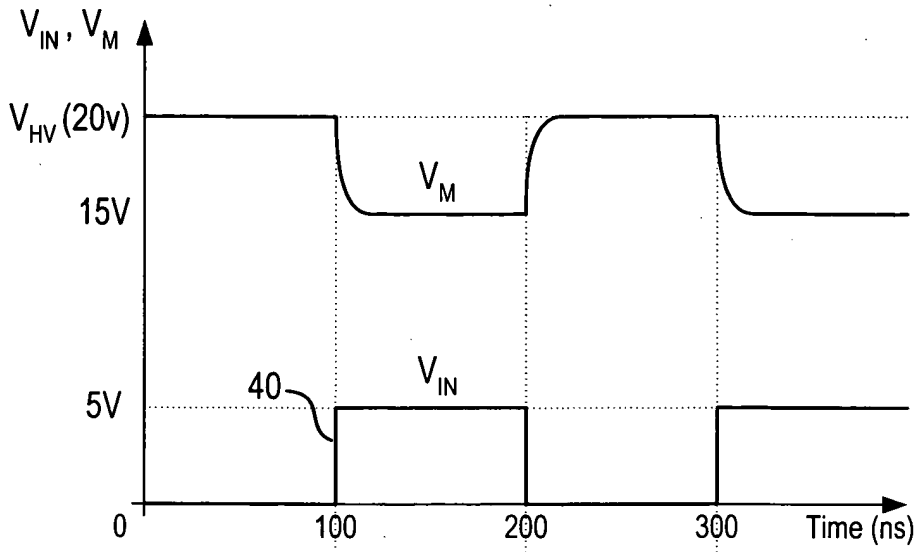


FIG. 5A

FIG. 5B

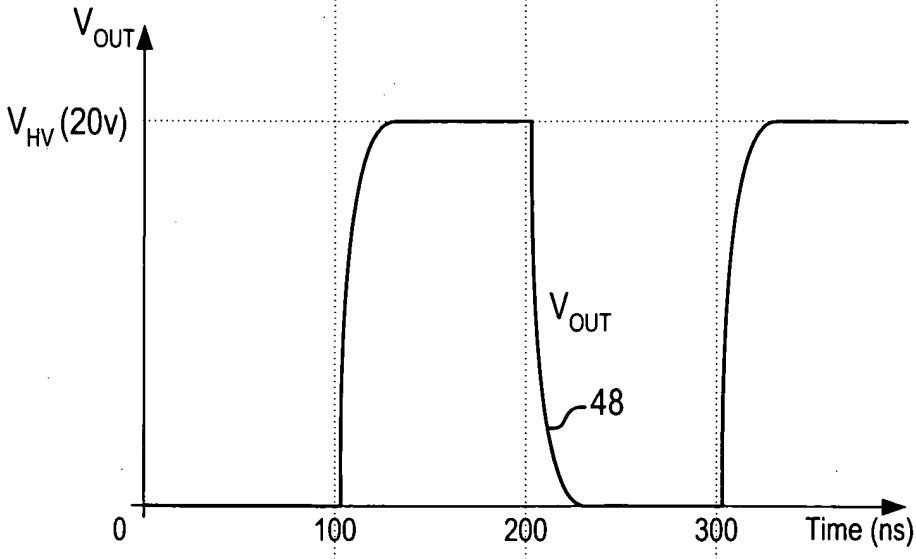


FIG. 5C

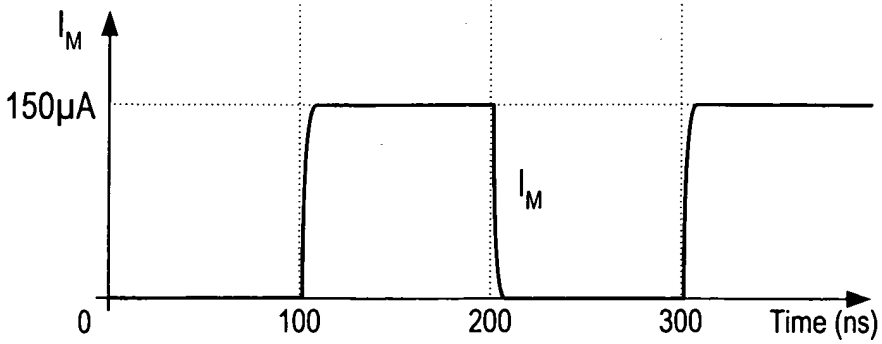
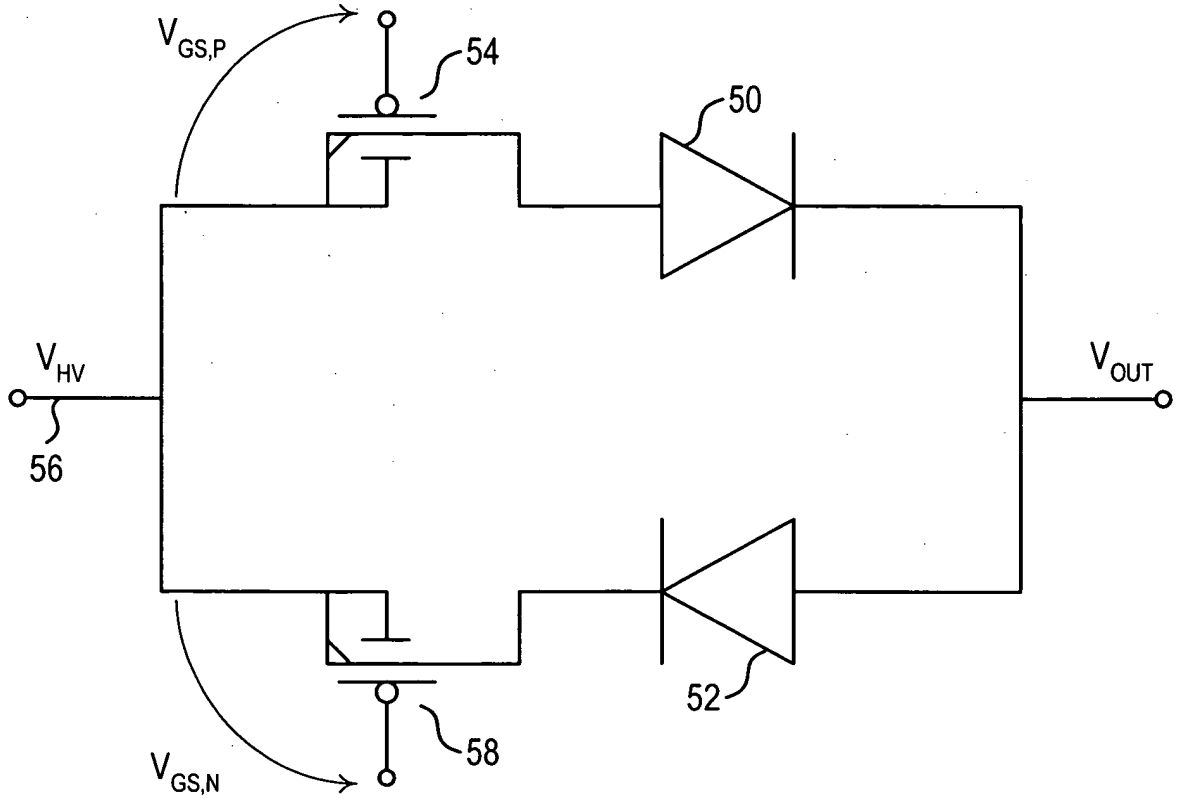


FIG. 5D

PRIOR ART



PRIOR ART

FIG. 6

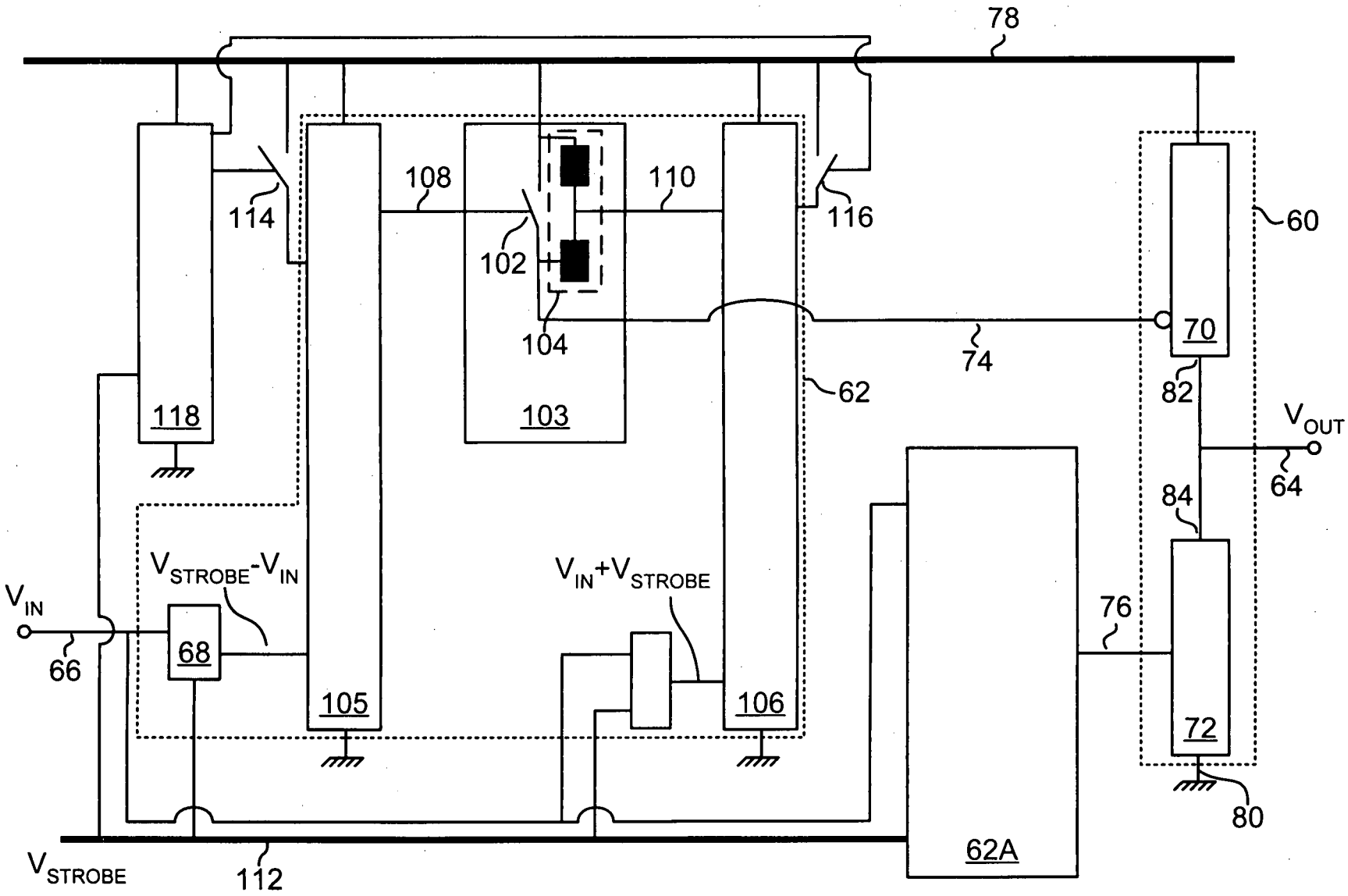

78
108
110
114
116
102
104
60
70
74
62
118
103
82
V_{OUT}
64
84
V_{STROBE}-V_{IN}
V_{IN}+V_{STROBE}
V_{IN}
66
68
76
105
106
72
80
62A
V_{STROBE}
112

FIG. 7

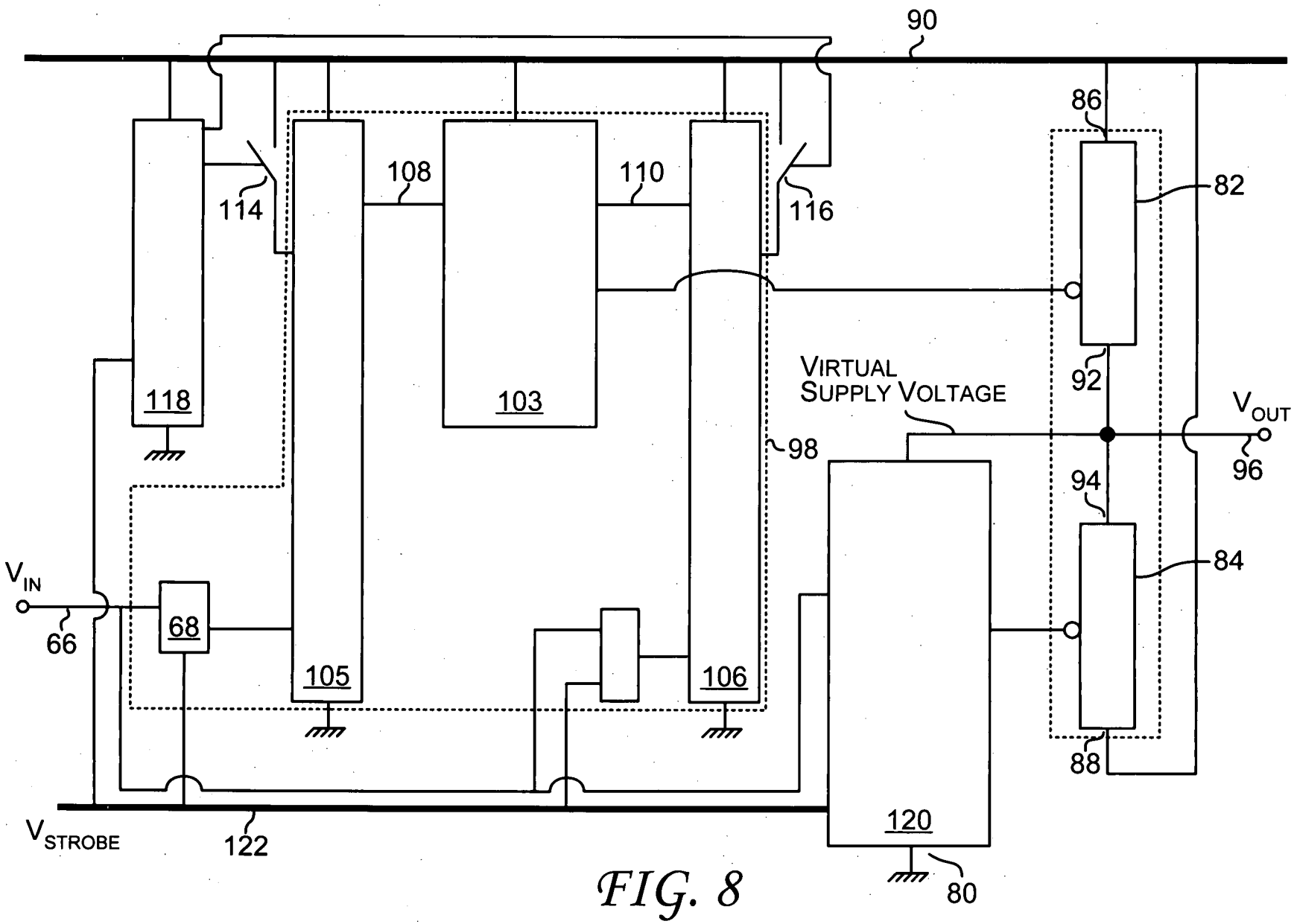

90
86
82
108
110
114
116
118
103
VIRTUAL
SUPPLY VOLTAGE
92
V_{OUT}
96
98
94
84
V_{IN}
66
68
105
106
88
120
V_{STROBE}
122
80

FIG. 8

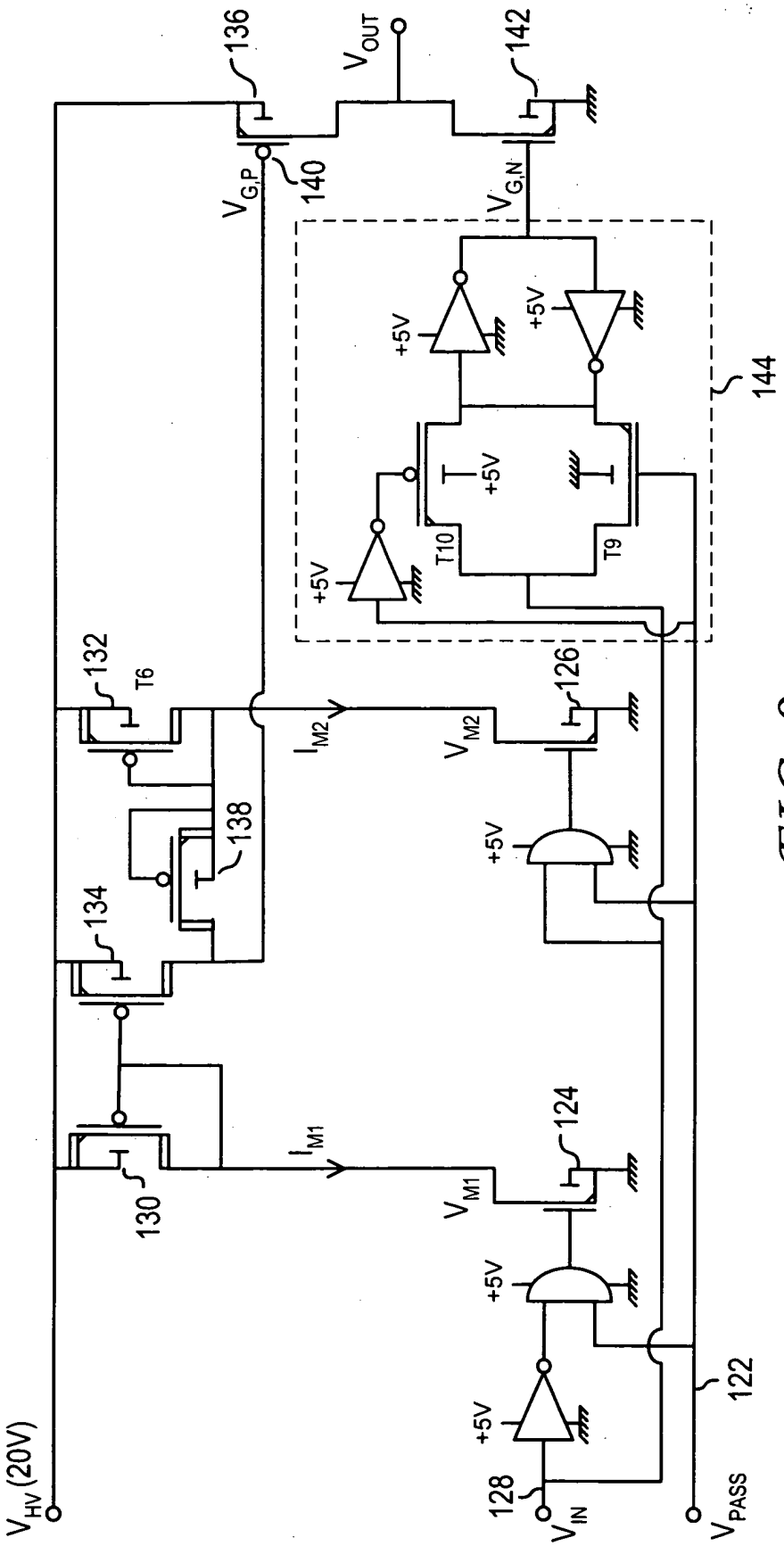

V_{HV}(20V)
130
132
T6
134
138
136
140
142
144
T10
T9
126
124
122
128
V_{IN}
V_{PASS}
V_{OUT}
$V_{G,P}$
$V_{G,N}$
I_{M1}
I_{M2}
V_{M1}
V_{M2}
+5V

FIG. 9

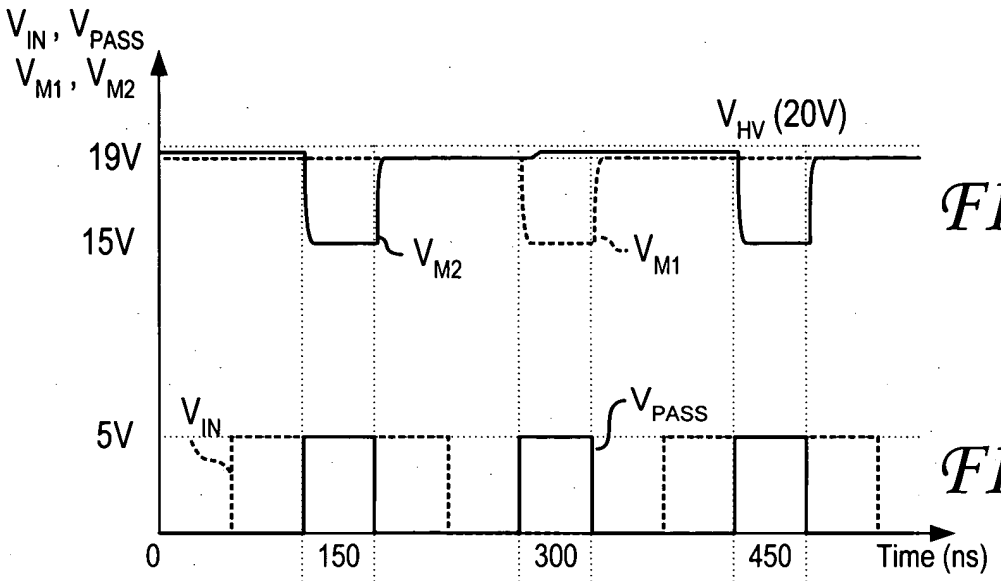


FIG. 10D

FIG. 10C

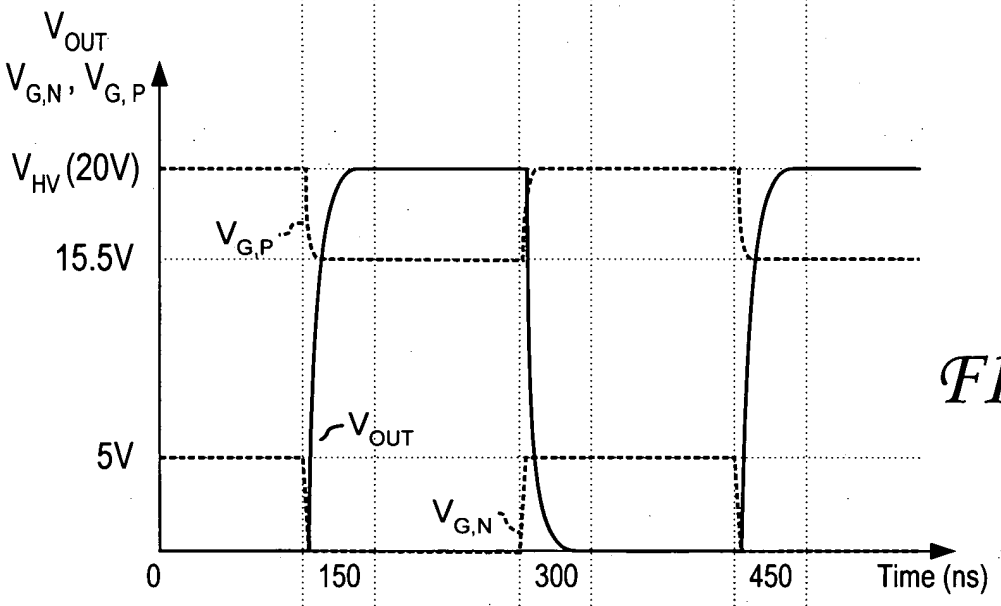


FIG. 10B

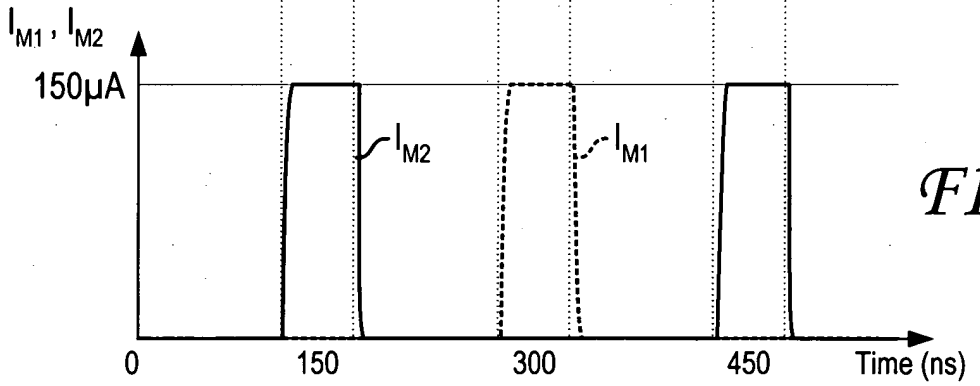


FIG. 10A

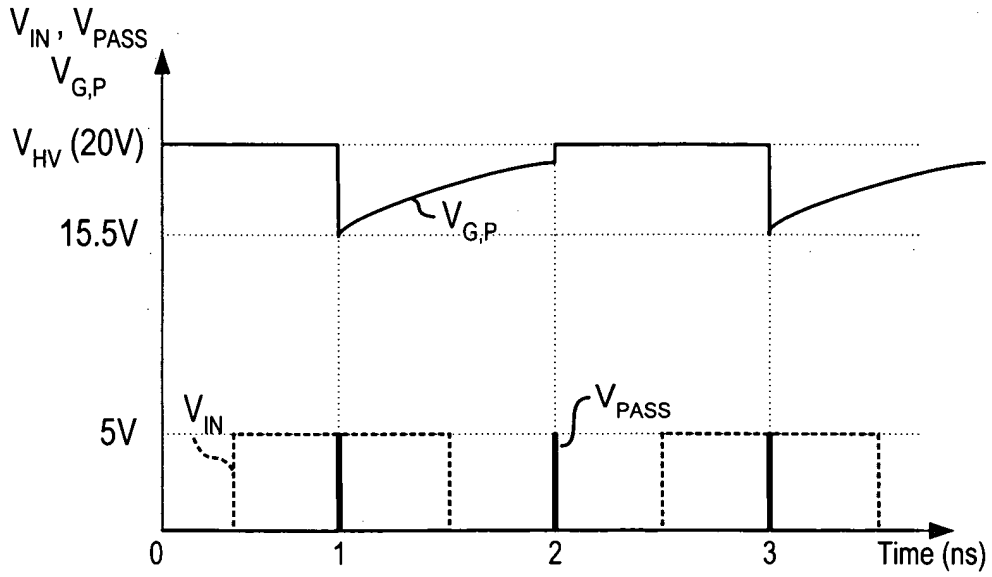
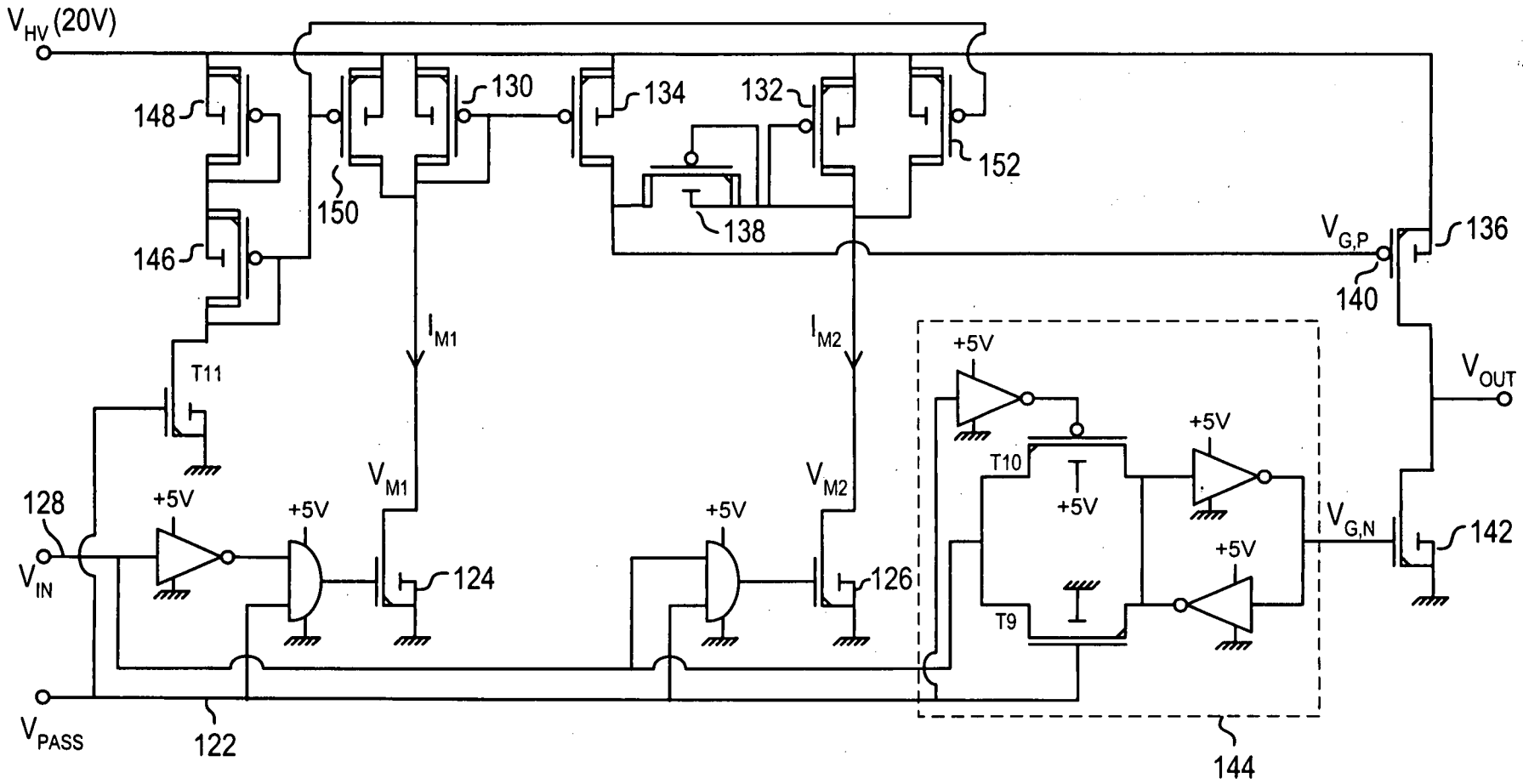


FIG. 11



IMPROVED DYNAMICALLY CONTROLLED HIGH-VOLTAGE LEVEL-SHIFTER WITH EXTREMELY LOW POWER CONSUMPTION

FIG. 12

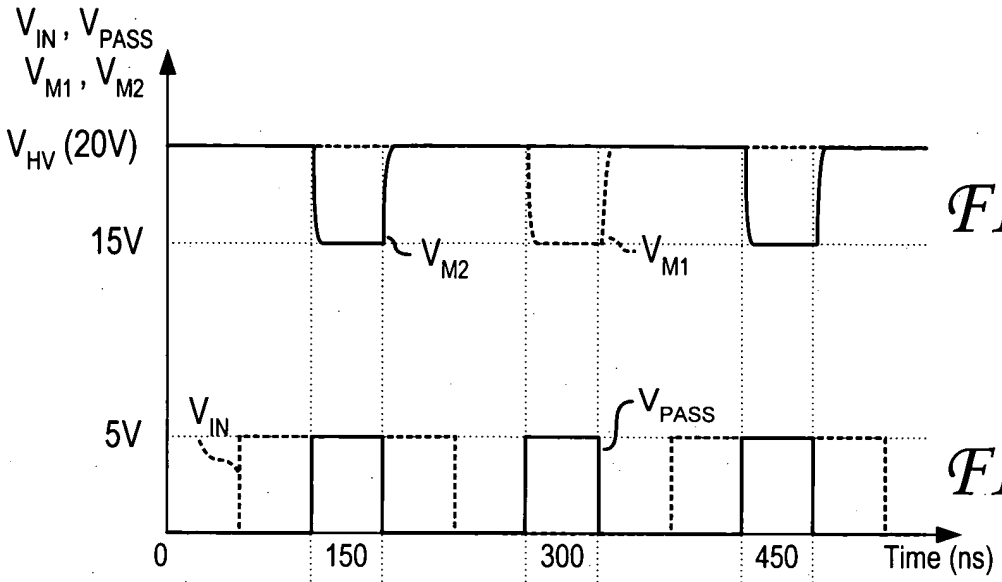


FIG. 13D

FIG. 13C

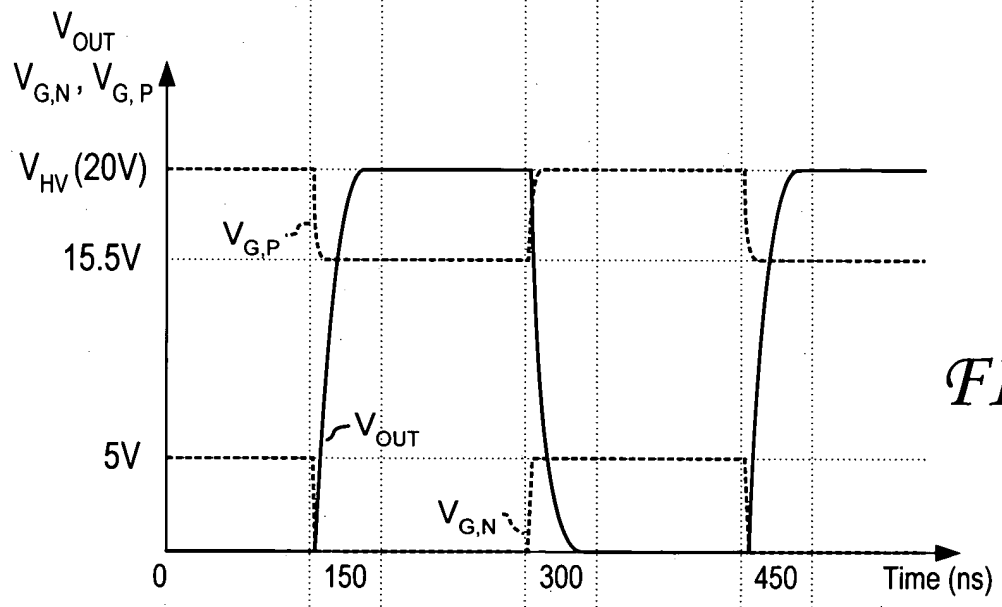


FIG. 13B

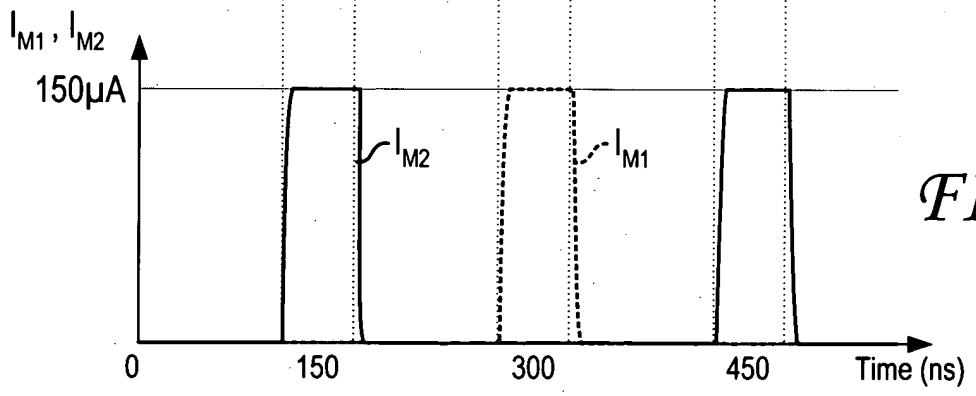


FIG. 13A

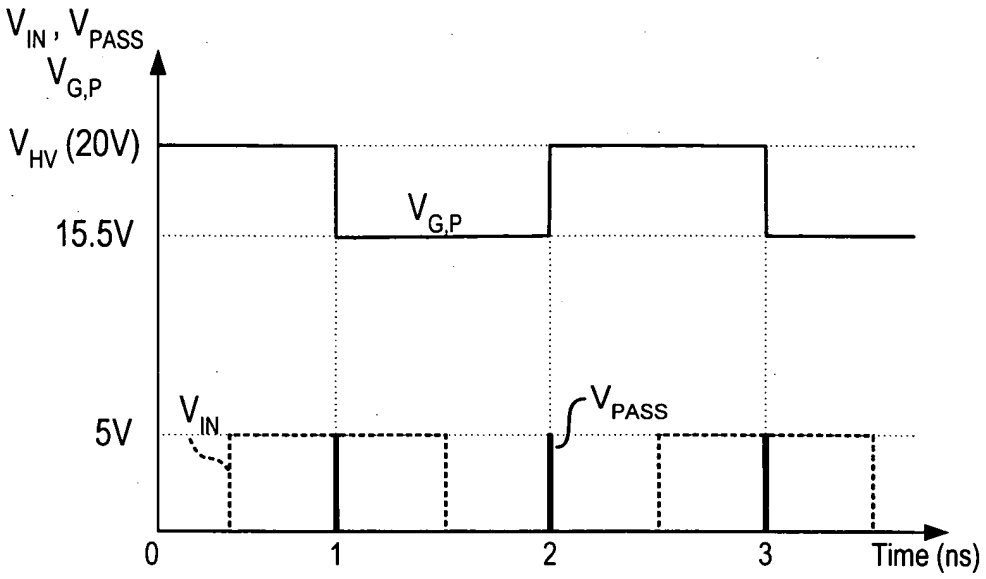


FIG. 14

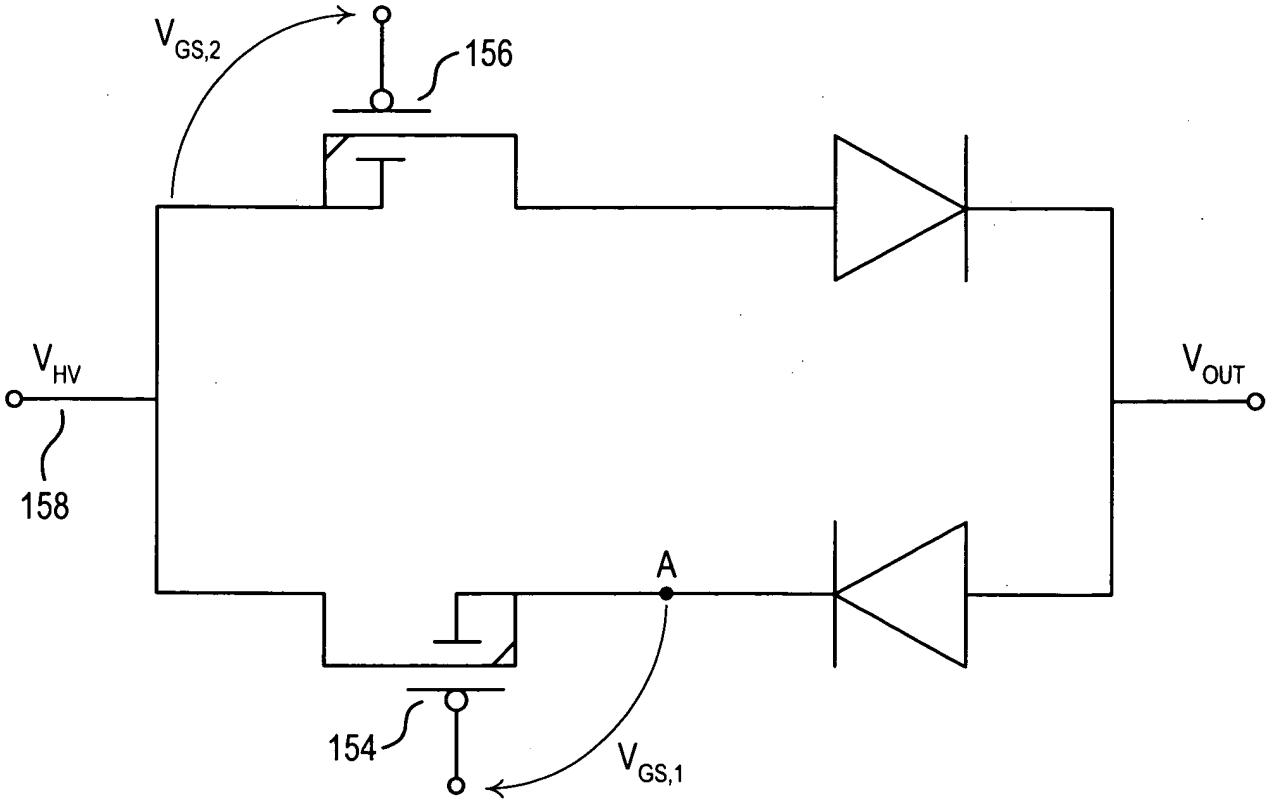


FIG. 15

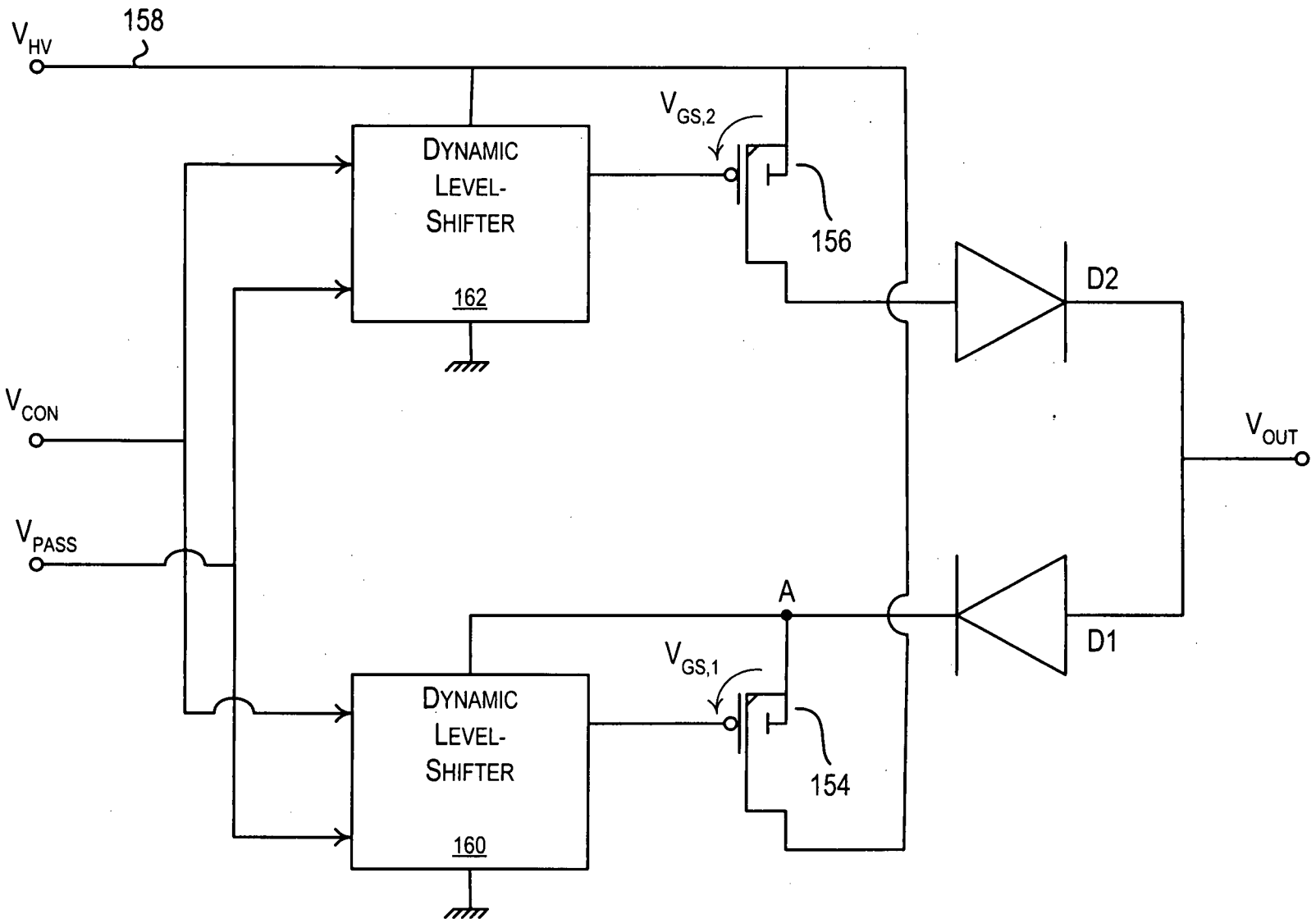

V_{HV}
158
$V_{GS,2}$
DYNAMIC LEVEL-SHIFTER
162
156
D2
V_{CON}
V_{PASS}
V_{OUT}
A
$V_{GS,1}$
DYNAMIC LEVEL-SHIFTER
160
154
D1

FIG. 16

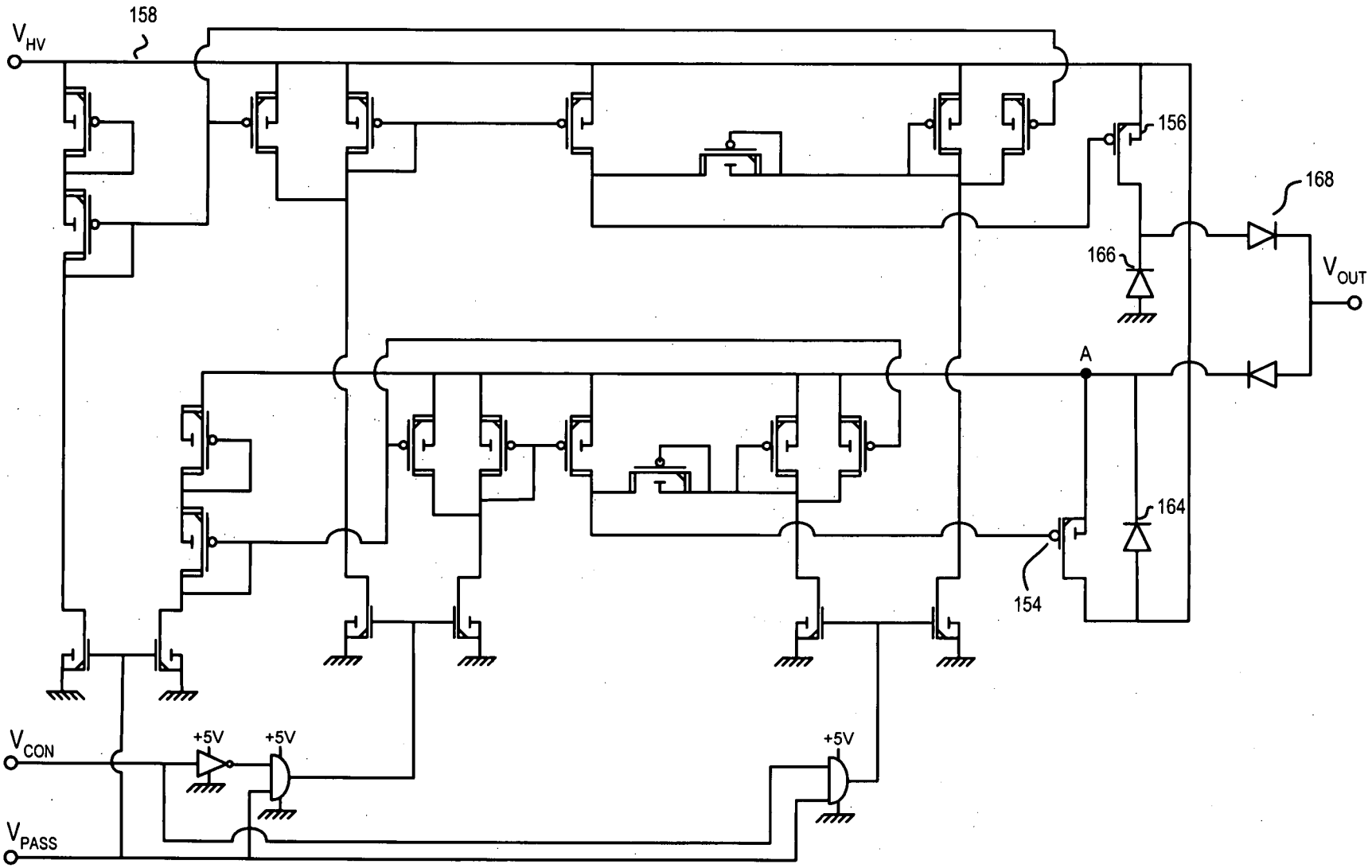


FIG. 17

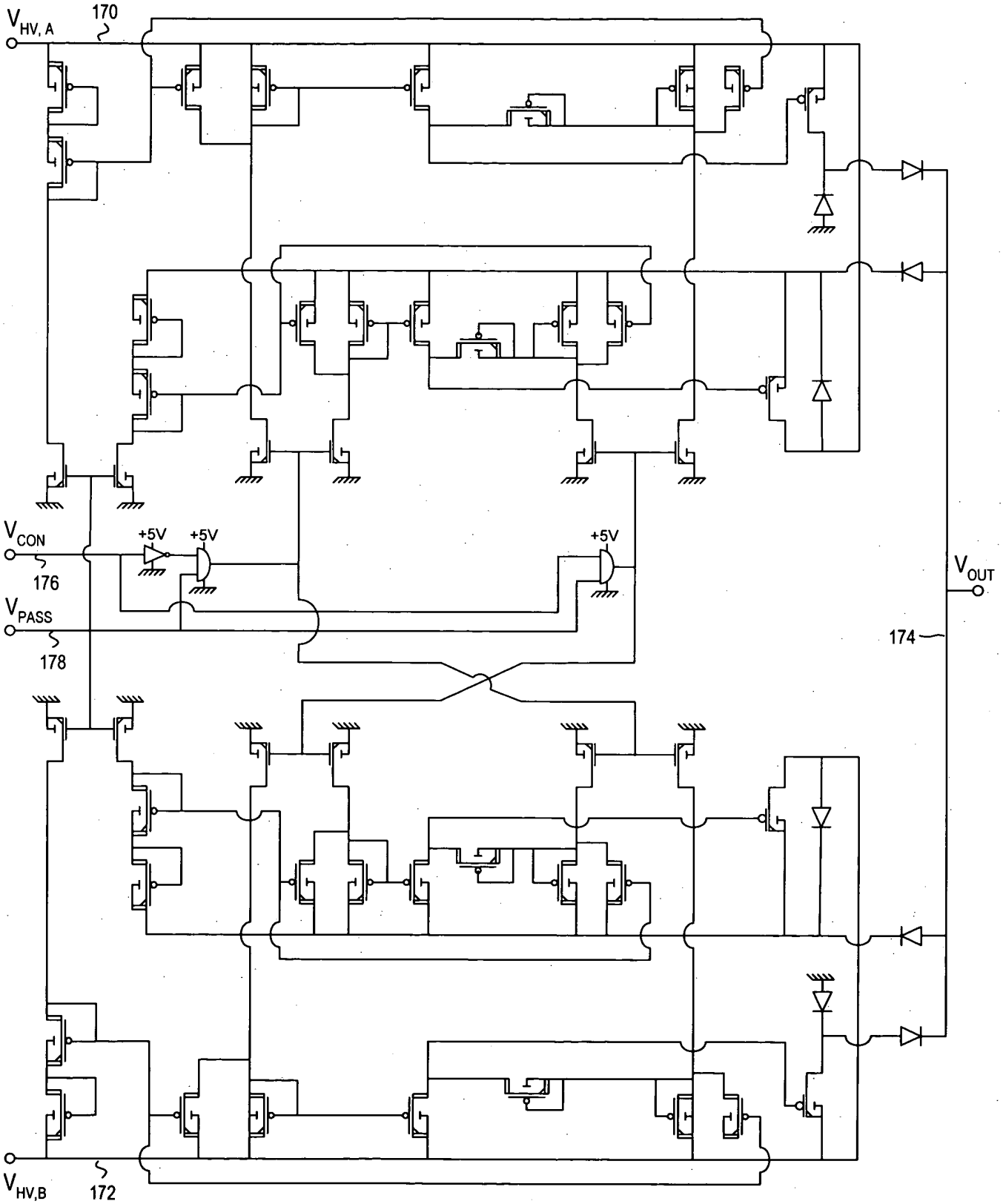


FIG. 18

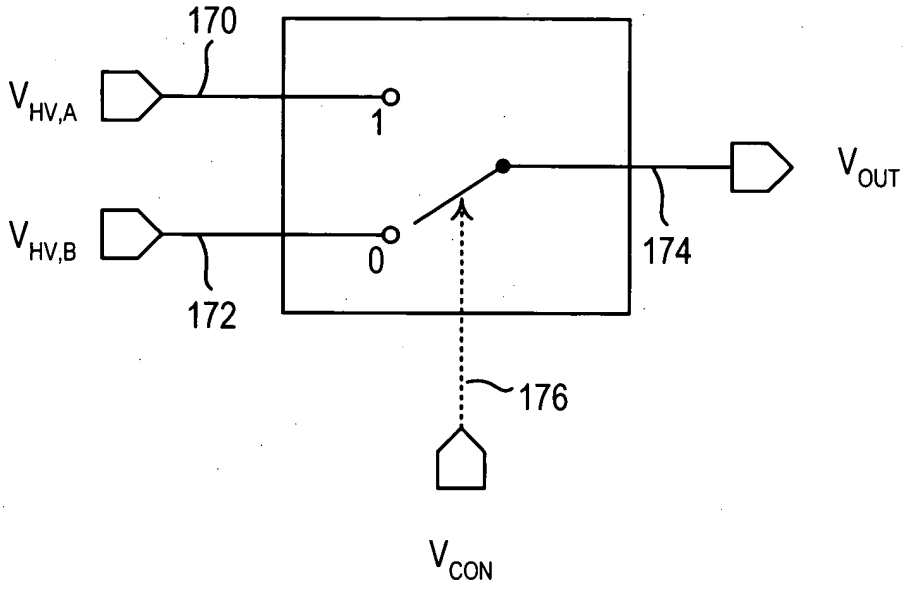


FIG. 19

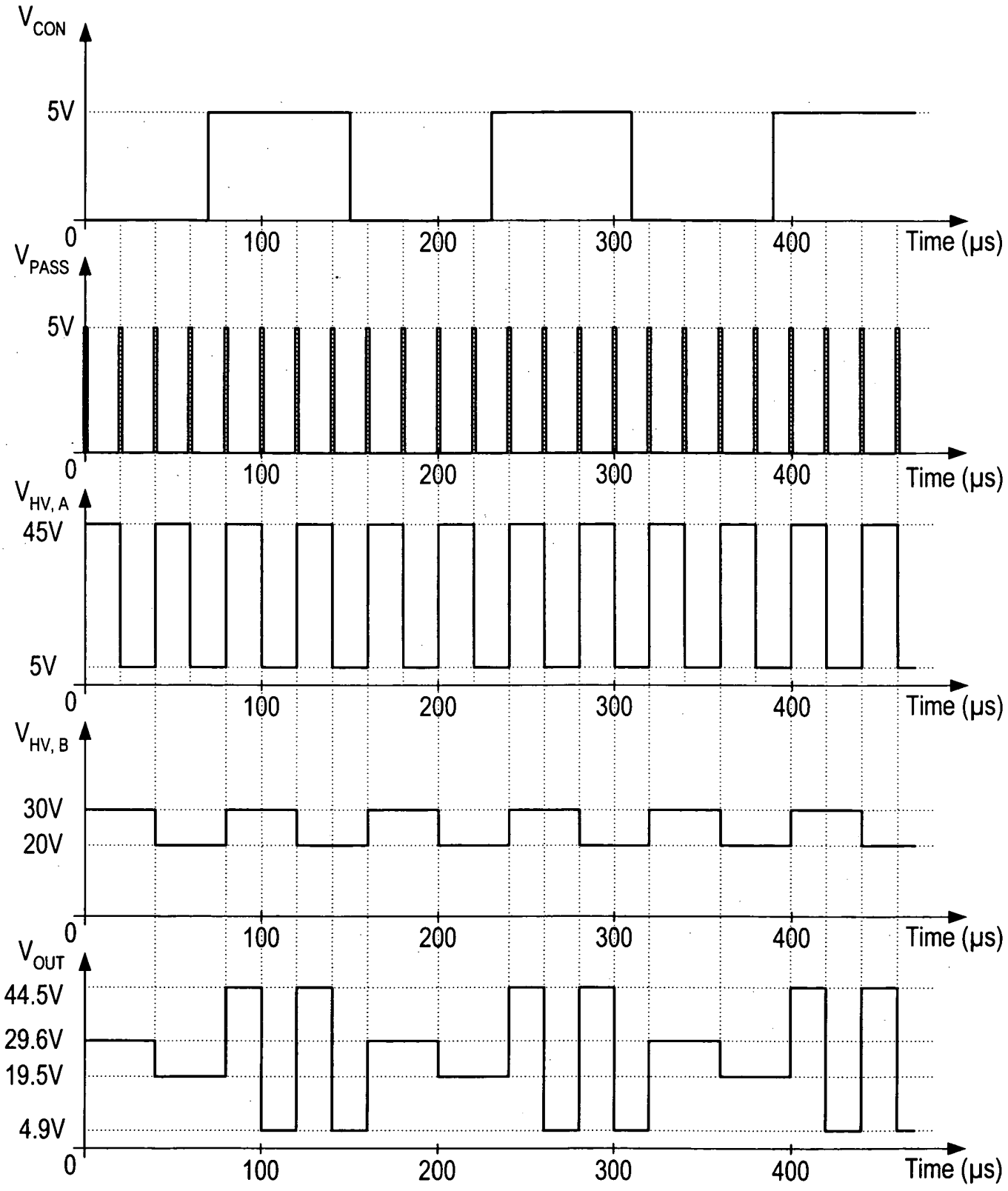

V_{CON}
5V
0
100
200
300
400
Time (μs)
V_{PASS}
5V
0
100
200
300
400
Time (μs)
$V_{HV, A}$
45V
5V
0
100
200
300
400
Time (μs)
$V_{HV, B}$
30V
20V
0
100
200
300
400
Time (μs)
V_{OUT}
44.5V
29.6V
19.5V
4.9V
0
100
200
300
400
Time (μs)

FIG. 20

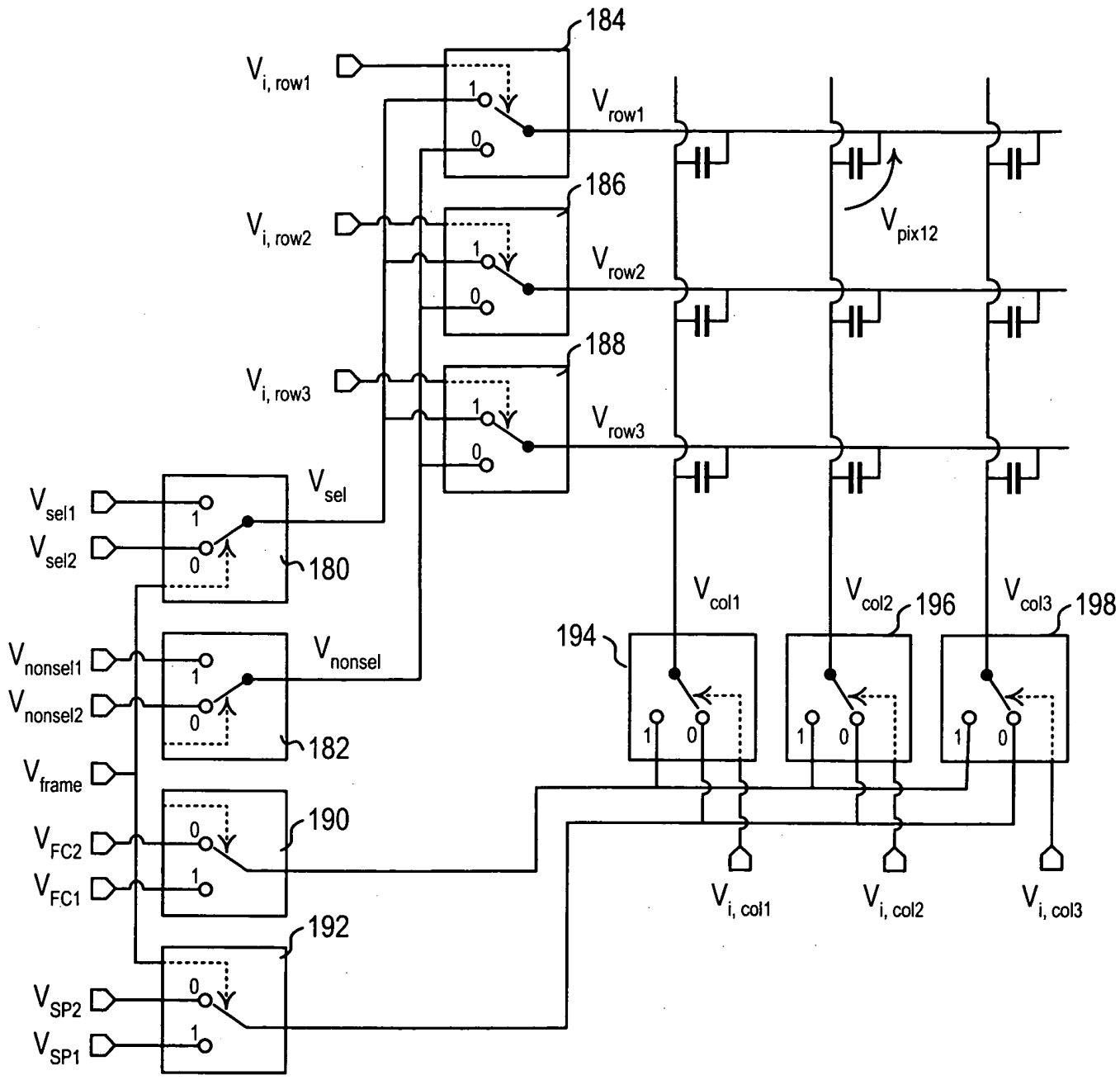

184
$V_{i, row1}$
V_{row1}
186
$V_{i, row2}$
V_{row2}
V_{pix12}
188
$V_{i, row3}$
V_{row3}
V_{sel1}
V_{sel2}
V_{sel}
180
$V_{nonsel1}$
$V_{nonsel2}$
V_{nonsel}
182
V_{frame}
V_{FC2}
V_{FC1}
190
192
V_{SP2}
V_{SP1}
194
V_{col1}
V_{col2}
196
V_{col3}
198
$V_{i, col1}$
$V_{i, col2}$
$V_{i, col3}$

FIG. 21

FC	SP	SP
SP	FC	FC
FC	SP	FC

FIG. 22

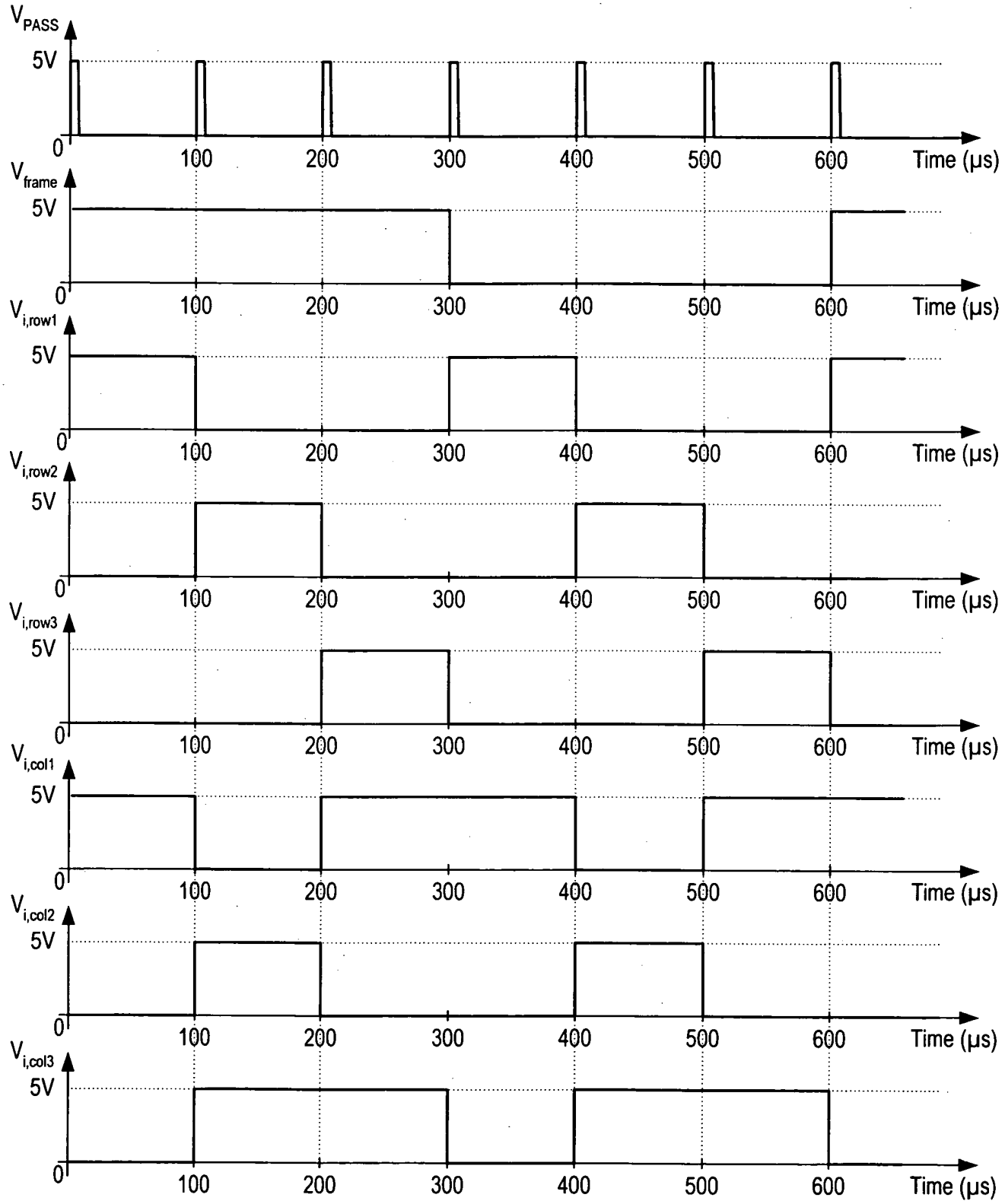

V_{PASS}
5V
0
100
200
300
400
500
600
Time (μs)
V_{frame}
5V
0
100
200
300
400
500
600
Time (μs)
$V_{i,row1}$
5V
0
100
200
300
400
500
600
Time (μs)
$V_{i,row2}$
5V
0
100
200
300
400
500
600
Time (μs)
$V_{i,row3}$
5V
0
100
200
300
400
500
600
Time (μs)
$V_{i,col1}$
5V
0
100
200
300
400
500
600
Time (μs)
$V_{i,col2}$
5V
0
100
200
300
400
500
600
Time (μs)
$V_{i,col3}$
5V
0
100
200
300
400
500
600
Time (μs)

FIG. 23A

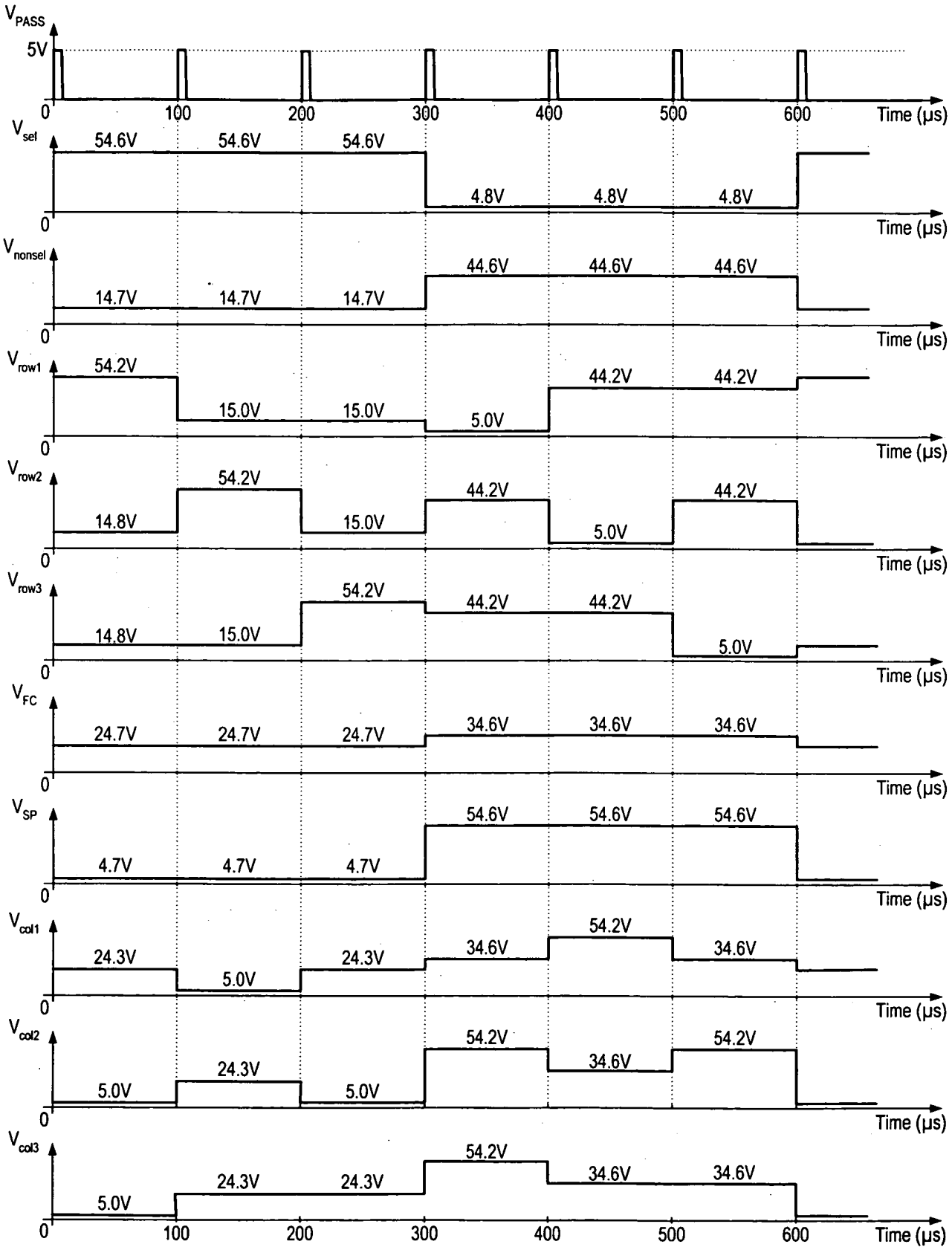

V_{PASS}
5V
0
100
200
300
400
500
600
Time (μs)
V_{sel}
54.6V
54.6V
54.6V
4.8V
4.8V
4.8V
V_{nonsel}
14.7V
14.7V
14.7V
44.6V
44.6V
44.6V
V_{row1}
54.2V
15.0V
15.0V
5.0V
44.2V
44.2V
V_{row2}
14.8V
54.2V
15.0V
44.2V
5.0V
44.2V
V_{row3}
14.8V
15.0V
54.2V
44.2V
44.2V
5.0V
V_{FC}
24.7V
24.7V
24.7V
34.6V
34.6V
34.6V
V_{SP}
4.7V
4.7V
4.7V
54.6V
54.6V
54.6V
V_{col1}
24.3V
5.0V
24.3V
34.6V
54.2V
34.6V
V_{col2}
5.0V
24.3V
5.0V
54.2V
34.6V
54.2V
V_{col3}
5.0V
24.3V
24.3V
54.2V
34.6V
34.6V

FIG. 23B

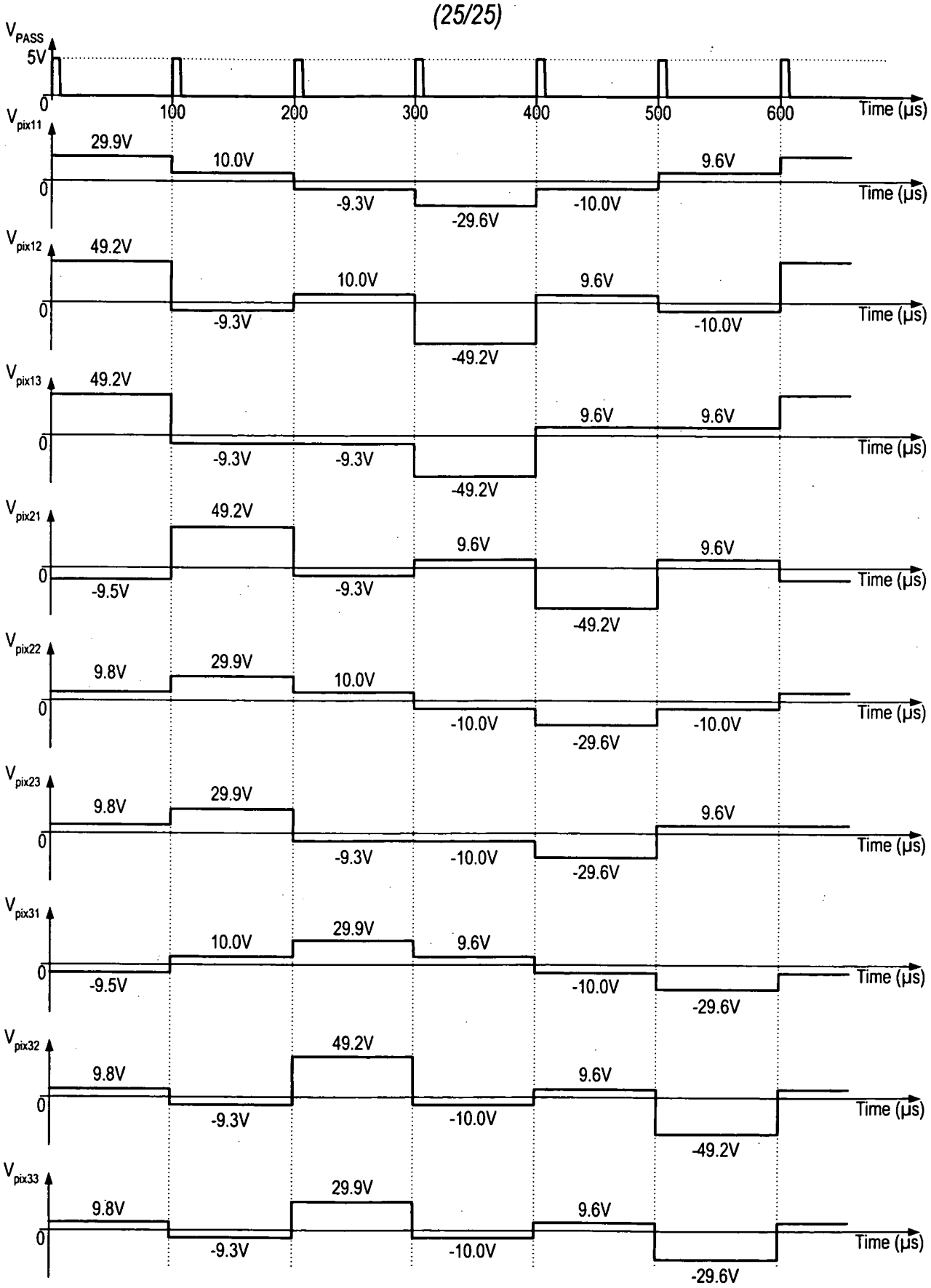

V_{PASS}
5V
0
100
200
300
400
500
600
Time (μs)
V_{pix11}
29.9V
10.0V
9.6V
-9.3V
-29.6V
-10.0V
V_{pix12}
49.2V
10.0V
9.6V
-9.3V
-10.0V
-49.2V
V_{pix13}
49.2V
9.6V
9.6V
-9.3V
-9.3V
-49.2V
V_{pix21}
49.2V
9.6V
9.6V
-9.5V
-9.3V
-49.2V
V_{pix22}
9.8V
29.9V
10.0V
-10.0V
-29.6V
-10.0V
V_{pix23}
9.8V
29.9V
9.6V
-9.3V
-10.0V
-29.6V
V_{pix31}
10.0V
29.9V
9.6V
-9.5V
-10.0V
-29.6V
V_{pix32}
9.8V
49.2V
9.6V
-9.3V
-10.0V
-49.2V
V_{pix33}
9.8V
29.9V
9.6V
-9.3V
-10.0V
-29.6V

FIG. 23C